

Supplementary Materials: Chain Extension and Synergistic Flame-Retardant Effect of Aromatic Schiff Base Diepoxide on Polyamide 6/Aluminum Diethylphosphinate Composites

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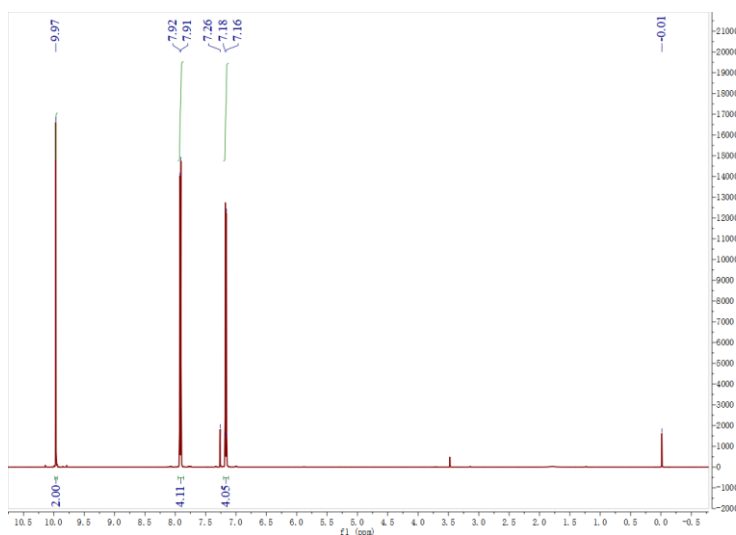


Figure S1. ¹H NMR spectrum of bis(4-formylphenyl) ether in CDCl₃.

¹H NMR (600 MHz, Chloroform-*d*, δ , ppm): 9.97 (s, 2 H, -CHO), 7.92 (d, 2H, Ar-H), 7.81 (d, 2H, Ar-H).

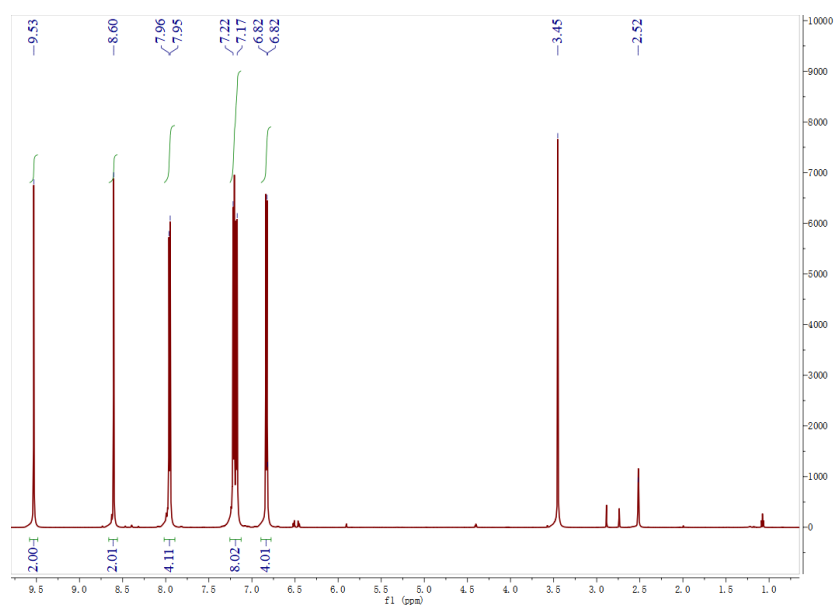


Figure S2. ¹H NMR spectrum of compound 5 in CDCl₃.

¹H NMR (600 MHz, DMSO-*d*₆, δ , ppm): 9.53 (s, 2 H, -OH), 8.60 (s, 2H, -C=N-), 7.95 (d, 4H, Ar-H), 7.22 (d, 4H, Ar-H), 7.17 (d, 4H, Ar-H), 6.82 (d, 4H, Ar-H).

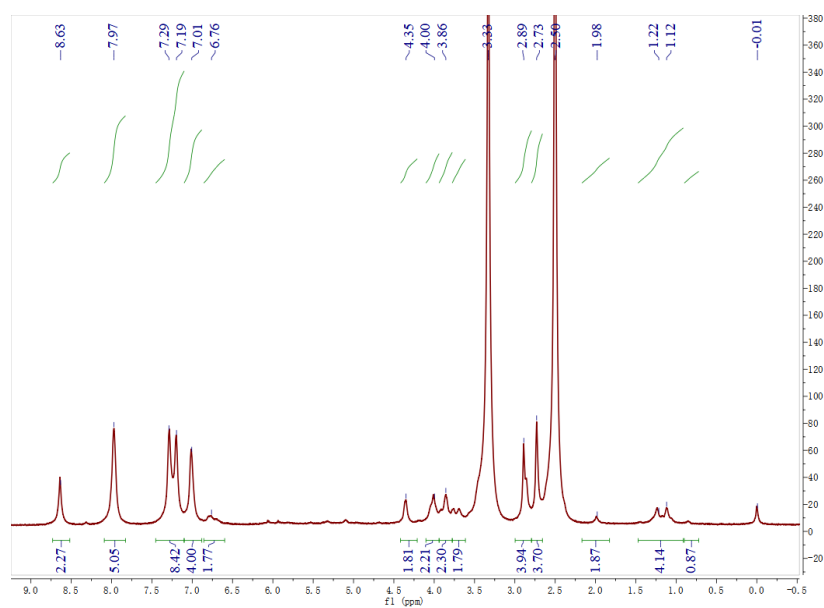


Figure S3. ^1H NMR spectrum of DES in DMSO-d_6 .

^1H NMR (600 MHz, Chloroform- d , δ , ppm): 8.63 (s, 2 H, $-\text{C}=\text{N}-$), 7.97 (d, 4H, Ar-H), 7.29 (d, 4H, Ar-H), 7.19 (d, 4H, Ar-H), 6.76 (d, 4H, Ar-H), 4.35 (d, 2H, CH), 4.20–3.75 (m, 4H, $-\text{CH}_2-$), 2.90–2.70 (m, 4H, $-\text{CH}_2-$).

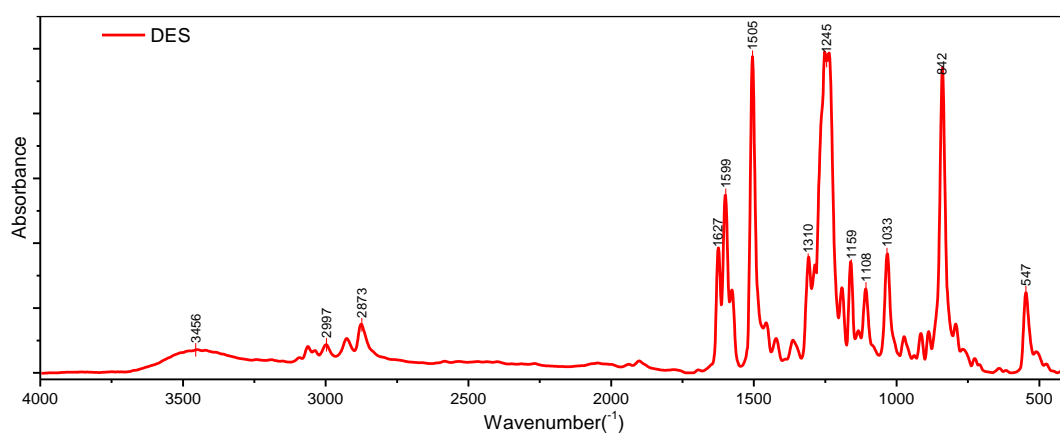


Figure S4. FTIR spectrum of DES.

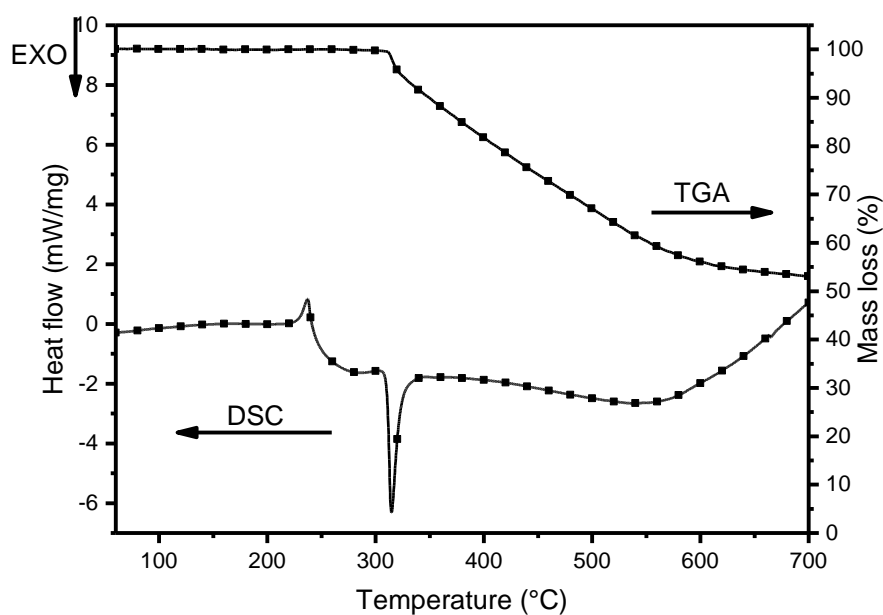


Figure S5. TGA and DSC curves of DES.

Table S1. Carboxyl and amino end-group concentration of chain-extended PA6 with different DES contents.

DES Content (wt. %)	Carboxyl End-Group Concentration ($\mu\text{mol/g}$)	Amino End-Group Concentration ($\mu\text{mol/g}$)
0	239.84	37.23
1	166.95	34.43
3	128.30	29.63
5	80.45	24.21

Table S2. The initial decomposition temperature at 5% weight loss ($T_{5\%}$), the temperature at the maximum decomposition rate (T_{max}), and the residue weight at 700 °C of neat PA6 and flame-retarded PA6.

Samples	$T_{5\%}$ (°C)	T_{max} (°C)	Char Residue (wt. %) (700 °C)
PA6	406	466	1.4
PA6/AIPi-13	392	446	1.8
PA6/AIPi-16	394	444	2.2
PA6/AIPi/DES-0.5	395	442	1.6
PA6/AIPi/DES-1	393	445	2.1
PA6/AIPi/DES-1.5	395	444	2.3
PA6/AIPi/DES-2	396	444	2.8